

Although no sound *classification* can be based on one single organ, a striking concordance exists between an attempted arrangement of the Mammalia according to the Fundus oculi and the most modern classification. The cases of disagreement are wonderfully few. These are restricted to the following:—

Chrysothrix leans towards the Aretopithecii. I find it necessary to separate the Galagos from the rest of the Lemurs—at least, as a sub-family. In the smaller Carnivores it is advisable to establish a separate family, the *Cynictidæ*, to include the otherwise viverrine genera, *Cynictis* and *Galictis*, together with *Mephitis*, hitherto placed with the *Mustelidæ*. The *Sciuromorpha* should be divided into *Sciuridæ* and *Pteromyidæ*, and *Castor* should decidedly be removed into the *Hystricomorpha* group, perhaps into the vicinity of the *Octodontidæ*. The Bats rank very low so far as the eye is concerned, possibly on account of their nocturnal habits. Among the Marsupials the *Diprotodontia* are decidedly lower than the *Polyprotodontia* chiefly on account of the high degree of development of the eyes of the *Didelphidæ* and *Dasyuridæ*. Since we meet with genera of the lowest type along with others of the highest type of retinal vascularisation, and again some without and others with the additional relic or specialisation of a Tapetum, it follows that the details of the vascularisation and of the Tapetum have been developed independently in the various main branches of the Mammalia.

In fine, the whole Fundus oculi affords a striking illustration of the working of progressive evolution, an example all the more valuable, since it illustrates the direct modifying effect of external factors upon a highly specialised organ—in the present case the continued influence of light upon the eye.

“The Influence of Increased Atmospheric Pressure on the Circulation of the Blood. (Preliminary Note.)” By LEONARD HILL, M.B. Communicated by Dr. MOTT, F.R.S. Received March 22,—Read May 17, 1900.

Paul Bert* recorded the arterial pressure in two dogs which he introduced, together with the kymograph, into a chamber, and submitted to a + pressure of 53 cm. Hg. The atmospheric pressure was raised to this height in the course of three-quarters of an hour. The mean arterial pressure rose in one dog 16 mm. Hg., in the other 46 mm. Hg.; the pulse frequency fell in the first from 216 to 200, and the respiration from 41 to 29 per minute. The respiratory oscillations of blood-pressure became increased. Bert ascribes the results

* ‘Pression Barométrique,’ Paris, 1878, p. 838.

as due to the diminution of the volume of the intestines—which results from the compression of the intestinal gas—and the consequent increased play of the intrathoracic organs. He was confirmed in this opinion by the fact that the substitution of oxygen for air made no difference in the results.

A. Smith* attributes the symptoms which arise in caisson workers partly to the effect of the increased pressure on the nervous tissue, and partly to the congestion of the blood in the neural axis. He supposes that the blood is driven by the compressed air from the periphery to the cranio-vertebral cavity. This mechanical explanation of caisson disease is contrary to the supposition which, theoretically, seems correct, viz., that the atmospheric pressure is equally transmitted by the blood to all parts.

I have put the matter to the test of experiment.

Method.—An anæsthetised dog or cat is placed at the bottom of an autoclave after the insertion of a cannula in the carotid artery, and, in some cases, of one in the vena cava superior, has been carried out. The cannulae are connected with Hg. monometers, and these, together with a slow-movement recording drum, are also placed in the autoclave.

The drum is then started and the monometers set to record the arterial and venous pressures. The lid of the autoclave is next screwed on, an oxygen bottle connected with the inlet tube and the pressure in the autoclave rapidly raised to + two atmospheres (30 lbs.). The outlet tap is finally opened, the pressure rapidly lowered, the lid taken off, and the record observed. The times of increasing and diminishing atmospheric pressure are noted with a watch. The whole operation only takes two or three minutes.

Results.—Although exposed to this rapid change of atmospheric pressure, the circulation of the blood scarcely varies. The arterial pressure and venous pressures either continue at the same level or very slightly fall. The respiratory oscillations are increased, and the pulse becomes slightly less frequent. The gas injected contains, roughly, 80 per cent. oxygen, and thus the oxygen tension is raised from 21 per cent. to about 190 per cent. of an atmosphere. The results are the same whether compressed air or oxygen are employed.

Conclusion.—The mechanical congestion theory of caisson disease is untenable.

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* Article "Caisson Disease," 'Allbutt's System of Medicine,' vol. 7, p. 38, 1899.